

REMARKS

The Office Action mailed on January 3, 2003, has been received and reviewed.

Claims 1-27 are currently pending in the above-referenced application.

Claims 6-17 and 24-27 have been withdrawn from consideration as being drawn to a nonelected invention. Each of claims 6-17 and 24-27 has been canceled without prejudice or disclaimer to the subject matter recited therein. The election, without traverse, to prosecute claims 1-5 and 24-27 is hereby affirmed.

Claims 1-5 and 18-23 each stand rejected.

New claims 28-34 have been added.

Reconsideration of the above-referenced application is respectfully requested.

Priority

A certified copy of the priority document (Singapore Application No. 200102650-9) is submitted herewith.

Objection to Specification

The title of the invention was been objected to as not describing the invention to which the claims are directed. The title has been amended to more accurately describe the subject matter recited in the claims that remain pending and under consideration in the above-referenced application. Accordingly, withdrawal of the objection to the specification is respectfully requested.

Objection to Claim

Claim 18 has been objected to for an informality therein. In particular, claim 18 was objected to for reciting "said plurality" without further specifying which plurality. Claim 18 has been amended to replace the recitation of "said plurality" with "said plurality of bond pads." It

is, therefore, respectfully submitted that claim 18 no longer includes the informality that was determined to be objectionable and requested that the objection thereto be withdrawn.

Rejections Under 35 U.S.C. § 112, Second Paragraph

Claims 1-5, 20, and 23 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite.

Claim 1 was objected to for reciting “for use.” While the phrase “for use” is perfectly acceptable in claiming a device (M.P.E.P. § 2173.05(g)), the phrase “for use in a semiconductor device package” has been removed from claim 1, thereby broadening the same.

Claims 4 and 23 were objected to for reciting the phrase “to be.”

First, the phrase “to be” does not appear in claim 23. Thus, the rejection of claim 23 on the basis that the recitation of “to be” therein is indefinite is moot.

Second, it was asserted that this phrase suggests that a “recess can be aligned or does not have to be aligned” with a bond pad. It is respectfully submitted that by reciting that a “laterally recessed area is positioned to be aligned laterally adjacent a bond pad” only allows for the laterally recessed area to be positioned such that it will be aligned laterally adjacent to the bond pad. In any event, claim 4 has been amended to replace the recitation of “to be aligned” with “for alignment,” which does not change the scope of claim 4, but removes the objectionable language therefrom.

Claims 4 and 23 were also rejected for reciting “a semiconductor die,” which is an element which assertedly lacks antecedent basis. This rejection is not understood, as use of the term “a” indicates an initial recitation of an element.

In any event, as antecedent basis for the element “a semiconductor die” exists in claim 1, and claim 4 refers to the same semiconductor die, claim 4 has been amended to recite “the semiconductor die” instead.

In claim 23, however, the recitation of “a semiconductor die” does not necessarily refer to the same semiconductor die as that referred to in claim 1. Accordingly, for the sake of clarity, claim 23 has been amended to recite “a corresponding semiconductor die.”

Claims 5 and 20 stand rejected for reciting “securing intermediate conductive elements.” With respect to this rejection, the Office Action provides “it is not clear where the intermediate conductive elements are located.” It is respectfully submitted that the locations of the intermediate conductive elements is not relevant to either the interposer of claim 5 or the assembly of claim 20, as neither of these claims recites intermediate conductive elements but, rather, “*equipment* for forming, positioning, or securing intermediate conductive elements.” (Emphasis supplied).

It appears that claims 2 and 3 were rejected merely for depending from claim 1.

In view of the foregoing, it is respectfully submitted that each of claims 1-5, 20, and 23 is in compliance with the requirements of 35 U.S.C. § 112, second paragraph, and, therefore, is in condition for allowance. It is, therefore, respectfully requested that the 35 U.S.C. § 112, second paragraph, rejections of claims 1-5, 20, and 23 be withdrawn.

Rejections Under 35 U.S.C. § 103(a)

Claims 1-4, 18, 19, and 21-23 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 6,252,298 to Lee et al. (hereinafter “Lee”), in view of U.S. Patent 6,242,283 to Lo et al. (hereinafter “Lo”).

M.P.E.P. 706.02(j) sets forth the standard for a Section 103(a) rejection:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Lee teaches a flexible circuit board 20, shown in FIG. 2 thereof, which includes a patterned circuit layer 26 and a protective layer 27 thereon. The patterned circuit layer 26 carries

bond pads 23, land pads 25, and circuit traces 24 that extend between corresponding bond pads 23 and land pads 25. In addition, the patterned circuit layer 26 includes a slot 22 formed therethrough. When the flexible circuit board 20 is positioned over a semiconductor die, as shown in FIGs. 4 and 7, bond pads of the semiconductor die are exposed through the slot 22. The protective layer 27 is positioned on a surface of the patterned circuit layer 26 to electrically insulate the circuit traces 24. As shown in FIG. 2, notches that are continuous with the slot 22 may be formed in the protective layer so as to provide access to corresponding bond pads 23 of the patterned circuit layer.

Lo describes a carrier 104 that has a slot 102 formed therethrough so that bond pads of a semiconductor die with which the carrier 104 is assembled will be exposed through the carrier 104. In addition, the carrier 104 of Lo includes bonding fingers 109 that are positioned adjacent to the opening 102 so as to facilitate electrical connection thereof with corresponding bond pads of a semiconductor die. The carrier 104 of Lo also includes connecting points 108 that communicate with corresponding bonding fingers 109.

Independent claim 1 of the above-referenced application recites an interposer that includes, among other things, a substrate element and a slot formed through the substrate element. The slot includes a first end which is configured to extend beyond an outer periphery of a semiconductor die upon assembly of the interposer therewith, as well as a second end that includes a laterally recessed area formed in only a portion thereof.

It is respectfully submitted that there are several reasons that Lee and Lo do not support a *prima facie* case of obviousness against any of claims 1-4, 18, 19, or 21-23.

First, it is respectfully submitted that neither Lee nor Lo, taken either together or separately, teaches or suggests each and every element of any of claims 1-4, 18, 19, or 21-23.

In particular, with respect to the subject matter recited in independent claim 1, Lee and Lo both lack any teaching or suggestion of an interposer with a substrate element that includes a slot with a second end that includes a laterally recessed area formed in only a portion thereof. Instead of a substrate element that includes a slot with a laterally recessed area, the teachings of Lee are limited to a *protective layer* that is positioned on a substrate and that includes a slot with laterally

recessed areas. Moreover, the laterally recessed areas of the slot of Lee are not located in an end of the slot but, rather, along the sides thereof.

Claims 2-4 are each allowable, among other reasons, as depending either directly or indirectly from claim 1, which is allowable.

Claim 4 is further allowable since neither Lee nor Lo teaches or suggests that an interposer may include a slot with a recessed area which is positioned in only a portion of an end thereof so as to be located between a bond pad and an outer periphery of a semiconductor die upon positioning of the interposer on the semiconductor die.

Independent claim 18 is also allowable since Lee and Lo both lack any teaching or suggestion of an interposer with a substrate element that includes a slot with a second end that includes a laterally recessed area formed in only a portion thereof. Rather, the teachings of Lee are limited to a *protective layer* that is positioned on a substrate and that includes a slot with laterally recessed areas. Moreover, the laterally recessed areas of the slot of Lee are not located in an end of the slot but, rather, along the sides thereof.

Each of claims 19 and 21-23 is allowable, among other reasons, as depending either directly or indirectly from claim 18, which is allowable.

Claim 23 is additionally allowable because neither Lee nor Lo teaches or suggests an interposer as part of a strip. To the contrary, the carriers that are taught in Lo are part of a wafer, while Lee is silent as to whether or how the flexible circuit boards thereof are associated with other flexible circuit boards.

Second, it is respectfully submitted that one of ordinary skill in the art would have no reason to believe that the asserted combination of Lee and Lo would successfully result in the subject matter recited in any of claims 1-4.

In making a determination of whether or not claims are obvious over the considered prior art, the teachings of the cited art must be considered in their entirety, including disclosures which teach away from the combination of from the claimed subject matter. M.P.E.P. § 2141.03.

In particular, independent claim 1 recites an interposer which includes a substrate element with a slot that has a first end that is “configured to extend beyond an outer periphery of a semiconductor die upon assembly of the interposer” therewith. As is best seen in FIGs. 2, 1D, and 1E of Lo, however, the carriers 104 thereof are in wafer form and have outer peripheries which have substantially the same dimensions as outer peripheries of the semiconductor dice with which the carriers 104 are to be assembled so that the outer peripheries of each carrier 104 and its corresponding semiconductor die are in alignment. It would, therefore, be impossible for an end of the slot 102 of any of the carriers 104 described in Lo to “extend beyond an outer periphery of [its corresponding] semiconductor die . . .,” as recited in independent claim 1.

Third, it is respectfully submitted that Lo teaches away from the subject matter recited in independent claim 1, as well as from claims 2-4 that depend therefrom.

More specifically, the slot 102 of the carrier 104 of Lo could not extend beyond an outer periphery of a semiconductor die with which the carrier 104 is (or is to be) assembled. Therefore, Lo teaches away from an interposer with a substrate element that includes a slot with a first end that is configured to extend beyond an outer periphery of a semiconductor die with which the interposer is assembled.

In view of the foregoing, it is respectfully requested that the 35 U.S.C. § 103(a) rejections of claims 1-4, 18, 18, and 21-23 be withdrawn.

Allowable Subject Matter/New Claims

The indication that claims 5 and 20 recite allowable subject matter is noted with appreciation. In view of this indication, new claims 28-35 have been added.

New independent claim 28 recites the combined subject matter of claims 1 and 5, without reciting that of intervening claim 4. New claims 29-31 depend from claim 28 and recite substantially the same subject matter as that recited in claims 2-4, respectively.

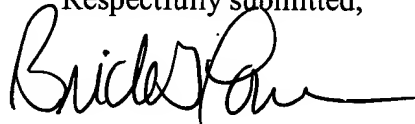
New independent claim 32 recites the combined subject matter of claims 18 and 20. New claims 33-35 depend from claim 32 and recite substantially the same subject matter as that recited in claims 21-23, respectively.

Consideration and allowance of new claims 28-34 are respectfully requested.

CONCLUSION

It is respectfully submitted that each of claims 1-5, 18-23, and 28-34 is allowable. An early notice of the allowability of these claims is respectfully solicited, as is an indication that the above-referenced application has been passed for issuance. If any issues preventing allowance of the above-referenced application remain which might be resolved by way of a telephone conference, the Office is kindly invited to contact the undersigned attorney.

Respectfully submitted,



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Enclosure: Version With Markings to Show Changes Made
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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE TITLE:

Please amend the title as follows:

INTERPOSER[, PACKAGES INCLUDING THE INTERPOSER, AND METHODS] WITH A
LATERAL RECESSED IN A SLOT TO FACILITATE CONNECTION OF INTERMEDIATE
CONDUCTIVE ELEMENTS TO BOND PADS OF A SEMICONDUCTOR DIE WITH
WHICH THE INTERPOSER IS ASSEMBLED